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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,922	09/29/2003	Tomohiro Okumura	3688ME-49	4135
22442	7590	08/01/2005	EXAMINER	
SHERIDAN ROSS PC 1560 BROADWAY SUITE 1200 DENVER, CO 80202			DHINGRA, RAKESH KUMAR	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 08/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/675,922

Applicant(s)

OKUMURA ET AL.

Examiner

Rakesh K. Dhingra

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 1-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 9 and 10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/29/03 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

Coil 8 is not shown in Figure 7 as indicated in Page 40, line 11 of disclosure.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The abstract of the disclosure is objected to because it has more than 150 words.

Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities:

- 1) Page 6, line 19 – it is suggested to replace "is required to rise the pressure" with "requires to raise the pressure";
- 2) Page 2, line 22 – it is suggested that "bee" may be changed to "been";

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Page 34, line 13 – it is suggested that the sentence “ The band pass filter 17 -----
-----from the high frequency power supply 5” may please be re-phrased correctly as in
its present form it is not clear.

3) Page 42, line 22 – it is suggested to delete “of”.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all
obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno et al (JP 09115851A) in view of Collins (US Patent No. 4,951,009).

Mizuno et al teach a plasma apparatus comprising:

a vacuum chamber 10 (Paragraph 0059);

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a gas supplying apparatus 14 for supplying a gas into said vacuum chamber

(Paragraph 0059);

an evacuating apparatus 13 for evacuating said vacuum chamber (Paragraph 0059);

a regulating of said vacuum chamber into a valve for controlling the pressure

of said vacuum chamber into a predetermined value (the apparatus has pressure regulating means as per Paragraphs 0063, 0065, 0070);

a sample electrode 11 for placing a sample in said vacuum chamber (0059);

a plasma generating apparatus 15 (Paragraph 0059, 0060);

a high frequency power supply 19 for supplying a high frequency electric power to sample electrode (Paragraph 0065);

a high frequency power supply (2.45 GHz) for supplying a high frequency electric power to said plasma generating apparatus via a matching circuit for plasma generation apparatus (Paragraph 0064, not shown in the Drawing).

Mizuno et al do not teach a matching circuit with toroidal cores.

Collins teach an apparatus (impedance matching circuit) as per Figure 8, 10 that uses toroidal cores to minimize leakage (Column 10, lines 10-27). Collins further teaches that such impedance matching circuits can be applied in manufacturing processes using plasma (Column 3, lines 15-20).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use impedance matching circuit using toroidal cores as taught by Collins in the apparatus of Mizuno et al to minimize leakage.

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Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno et al (JP 09115851A) in view of Collins (US Patent No. 4,951,009) and further in view of Zhao et al (US Patent No. 5,643,364) and Patrick et al (US patent No. 5,556,549).

Mizuno et al in view of Collins teach all limitations of claims except sampler and controller.

Zhao et al teach an apparatus (Figures 1-4) that uses a dual direction coupler 12c (sampler) that provides the forward and reflected power measurements to a control circuit 32 (controller) which then controls the power source 12a using comparator circuits 34, 36 resulting in more uniform processing of substrate (column 4, lines 65-67 and Column 5, lines 1-10).

Patrick et al teach an apparatus (Figure 5) that uses a programmable power and parameter control system comprising of sensor 506 (sampler) and a controller 504, for power matching of RF source 102 with plasma chamber 104 to achieve more consistent results in plasma process (Column 4, lines 65-67 and Column 8, lines 30-50).

Patrick further teaches that the programmable power and parameter control system may be specifically configured for various plasma process parameters (Column 8, lines 50-55).

Thus, Zhao et al and Patrick et al teach a a sampler a Sampler which, when the forward power of the high frequency electric power supplied to the plasma generating apparatus or the sample electrode is denoted by P_f and when the reflected power thereof is denoted by P_r , samples the power difference $P_f - P_r$, in every interval of 1 millisecond through 100 milliseconds; and a controlling apparatus which, when the integration of the

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power difference $P_f - p_r$ with respect to time reaches a predetermined value, stops the supply of the high frequency electric power.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use sampler (dual direction coupler) and controller (control circuit) as taught by Zhao, and configure these as per required process parameters as further taught by Patrick, in the apparatus of Mizuno et al in view of Collins to achieve more uniform and consistent processing of substrates.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Jewett et al (US Patent No. 6,291,938) teach an apparatus (Figure 6) that uses a plasma sensor 430 that can measure reflected power and a provide plasma status signal to a RF pulse controller 420.

Manawa (US Patent No. 5,688,357) teach an apparatus (Figure 1) that uses a computer 58 that monitors the reflected power level measured by a power sensor 50 and applies a control signal to the RF frequency generator 52.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone

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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Rakesh Dhingra


Parviz Hassanzadeh
Supervisory Patent Examiner
Art Unit 1763